

Weekly Report

2016.11.14-2016.11.20

1.This Week

Security Project

- 1.Revise the using document of our system.
- 2.Have two discussions with our project members and try to figure out how much more and how better we can do.
- 3.Have a discussion with LIN MING about integrating ontology & information analysis into our project.
- 4.Looking for valuable research topics through our project.

Paper Report

- 1.Present my paper report on this Tuesday.
- 2.Write the group blog article about the reported paper.
- 3.Write part of the news being pulished on wechat platform.

Others

- 1.Learn about basic information about professor Eduard Groeller who's coming on 12.9.

Paper Reading

1.An Analysis of Machine- and Human-Analytics in Classification

This paper presents an in-depth analysis of two visual analytics case studies, where both machine- and human-centric approaches were used to construct decision-tree models for classification tasks. One case study is for automated classification of the type of visualization images, and the other is for facial expression classification. They present with quantitative evidence that in both cases the human-centric approach produced better results.

Furthermore, they present empirical observations saying why human-centric method works better and uses information theory to prove it.

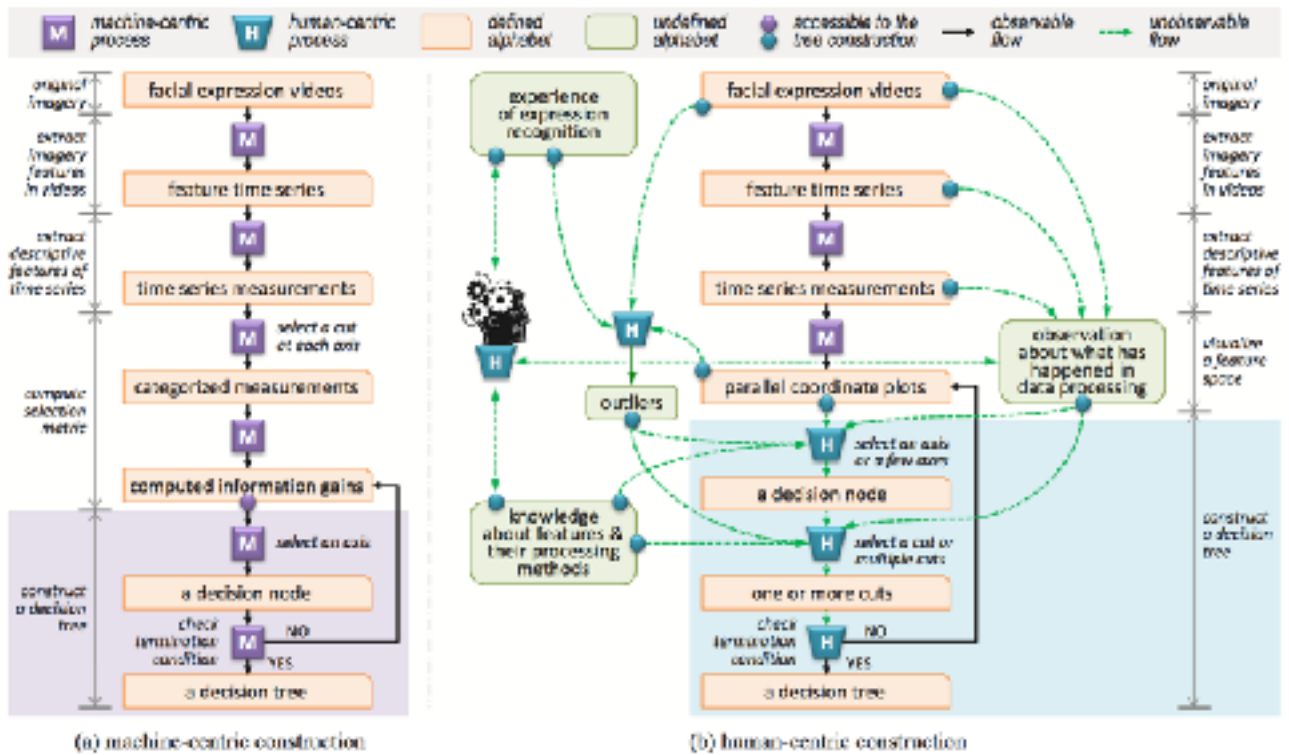


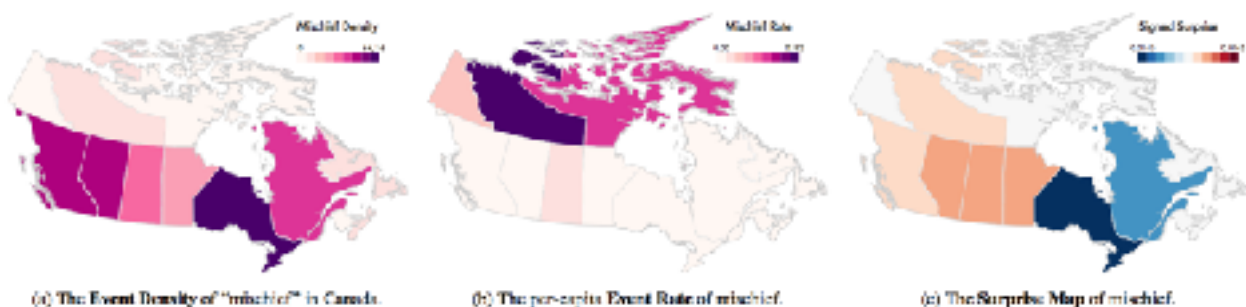
Fig. 7: Two flowcharts showing information flows with the two approaches constructing a decision tree in Case Study A (Section 4).

2.Surprise! Bayesian Weighting for De-Biasing Thematic Maps

This paper apply Bayesian surprise to the information visualization domain to create Surprise Maps that rely on models of event density to calculate and present surprise. They present five different models in their experiment and provide an equation to compute the likelihood(used to generate posterior) for each model. Then they use KL-divergence to compute bayesian surprise(difference between the prior and posterior probabilities of each model):

$$KL(P(\mathcal{M}|D)||P(\mathcal{M})) = \sum_{i=1}^{|M|} P(M_i|D) \log \frac{P(M_i|D)}{P(M_i)}$$

In this way, they offer guidance on how to select meaningful models for these maps and overcome the flaws of traditional thematic maps that hide or obscure important spatio-temporal trends(due to fail to account for models of expectation). Pictures below shows an example of surprise map compared to traditional thematic maps.



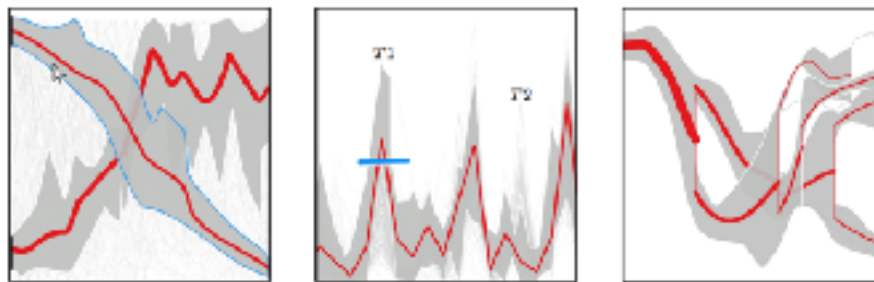
3. Multi-Granular Trend Detection for Time-Series Analysis

They propose a geometric model that guarantees detection of trends when they are present (based on three parameters: granularity, support-size, and duration). The specific algorithm is shown below. It is revised from the work by Kreveld.

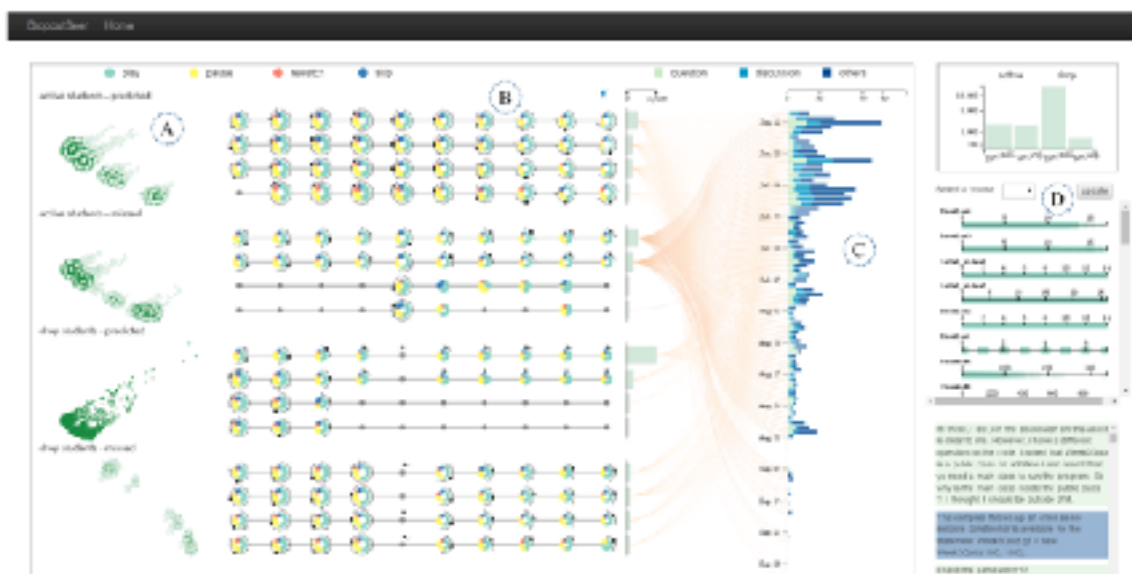
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Algorithm 1 Compute the  $\text{multigrup}(T)$ 
Input: a non-empty set  $T$  of  $n$  time series in the interval  $[a, b]$ .
Output: the set of maximal groups starting at  $t_0$ .
  1.  $t_0 \leftarrow \min(T)$ 
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Then, they explore different visual styles and showed how they relate to the tasks that a trend-detection system should support. Interactions such as selection brush, initial configuration, time sweep and highlighting and selection are provided for better trends exploration.



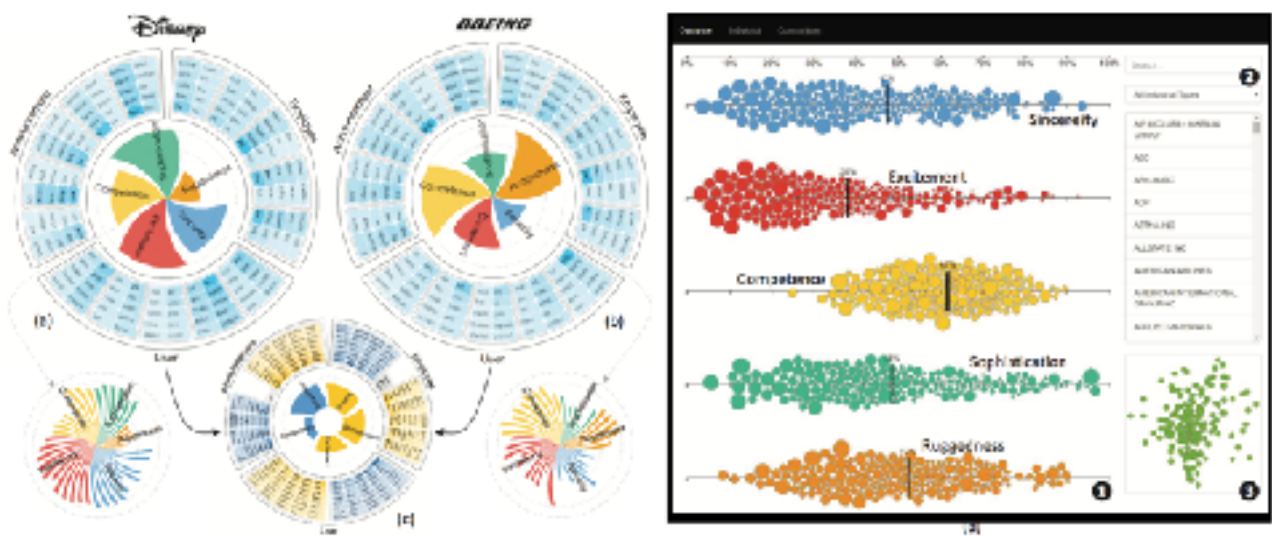
4. DropoutSeer: Visualizing Learning Patterns in Massive Open Online Courses for Dropout Reasoning and Prediction



This paper propose DropoutSeer to help both instructors and machine learning researchers to analyze the relationship between the online learning activity and dropout behavior of learners. Both the heterogeneous data extracted from three different kinds of learner activity logs (i.e., clickstream, forum posts and assignment records) and the predicted results are visualized in the proposed system.

The picture above shows the DropoutSeer system for the analysis of a java programming course: (A) learner groups clustered by learning activity. (B) clickstream behavior and the assignment performance of different learner groups along the timeline. (C) posts of learners on the course forum. (D) overall distribution at the top, the dashboard in the middle, and the forum content at the bottom.

5.SocialBrands: Visual Analysis of Public Perceptions of Brands on Social Media



This paper presents SocialBrands for brand managers to understand public perceptions of brands on social media. They extracted linguistic features from driving factors of user imagery, employee imagery and official announcement, and quantify the associations between brand perceptions and social media factors. Their visualization includes visual aggregation, summarization and explanation of brand perceptions: (a,b) each illustrates a brand's perceived personality (c) highlights the similarities and differences of two brands in their perceived personalities and topic discussions on social media. (d) The Overview of brand perceptions: (1) summarization of the distribution of brands over personality traits and the clusters of brands; (2) search and filtering widgets; (3) MDS embedding of brand perceptions.

To Do

1.Learn about the basic back end coding techniques and tools, especially back end coding part of the security project and trying to understand the whole coding from the back end to the front.

2. Keep up with the security project, re-think about our project and find out which parts can be revised.
3. Try to find research topics through the security project.
4. Write seminar course thesis and prepare for seminar course presentation.